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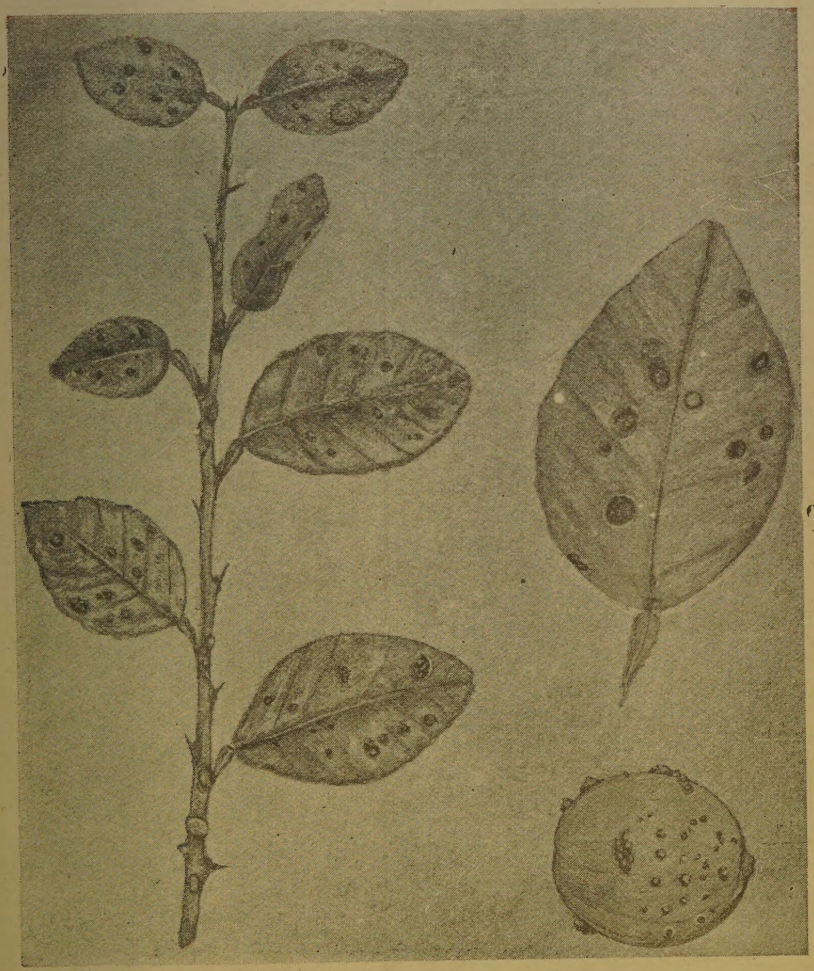
DIRECTORATE OF PLANT PROTECTION, QUARANTINE & STORAGE
MINISTRY OF FOOD AND AGRICULTURE, GOVERNMENT OF INDIA

PLANT PROTECTION BULLETIN

SCIENCE IN PRACTICE



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DEVELOPMENT OF PLANT PROTECTION SERVICES IN ASIA*

The F. A. O. Regional Meeting on Food & Agricultural Programmes and Outlook in Asia and the Far East held in Bangalore (Mysore State) from 27th July to 5th August 1953 recognised that the heavy losses from crop diseases and pests, both on the farm and in storage, could be minimized by effective plant protection services and wider use of pesticides. Japan has a well developed plant protection service, and India, Pakistan, Ceylon and Malaya have recently made marked advances in this field. But the scope for extension in nearly all countries is very great and the relatively low cost involved in establishing plant protection services in comparison with the magnitude of losses involved underlines the value of such a development. It was also emphasized that an integrated approach to the improvement of crop production and protection is essential, taking into account all possibilities of improving tillage practices, plant nutrition, plant breeding, and disease and pest control.

Other points mentioned include the high cost of pesticides, the progress of plant protection measures in community development areas, and the suggestion for an exchange of technical information on the production of such commodities as tea and pepper between countries of the region having problems in common.

The International Plant Protection Convention and the World Reporting Service on Plant Diseases and Pests were also considered by the Meeting, not so much for the purpose of calling for new action, but rather for a strengthening of the co-operation between the National Plant Protection Service in the Region and FAO. The Convention, which was approved by the Sixth Session of the FAO Conference, contains definite obligations on the part of Member Government for the setting up of efficient plant protection services, for the streamlining of quarantine regulations in order to check the spread of diseases and pests with the least possible hindrance to international trade, and for full co-operation in the World Reporting Service.

With regard to the regional organization, it was reported that in Europe such an organization already existed for two years in order to cope efficiently with regional problems. For Latin America the question was presently under consideration. As far as Asia and the Far East are concerned, it seemed advisable to postpone action until the meeting to be called by the United Kingdom in October or November of this year on the subject for a Phyto-Sanitary Convention for South—East Asia had been held.

In the discussion, appreciation was expressed of the 'FAO Plant Protection Bulletin' and it was suggested that continuous attention be given to the avoiding of any overlap with the publications of the Commonwealth Agricultural Bureaux. Attention was also drawn to the Plant Protection Bulletin of India and FAO was asked to foster the exchange of plant protection information within the region.

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* Extract from "Agriculture in Asia and the Far East—Development and outlook" FAO, Rome, Oct. 1953, pp. 31-32.

INTERNATIONAL PLANT PROTECTION CONVENTION*

Preamble

The contracting Governments, recognizing the usefulness of international co-operation in controlling pests and diseases of plants and plant products and in preventing their introduction and spread across national boundaries, and desiring to ensure close co-ordination of measures directed to these ends, have agreed as follows :—

ARTICLE I

Purpose and Responsibility

1. With the purpose of securing common and effective action to prevent the introduction and spread of pests and diseases of plants and plant products and to promote measures for their control, the contracting Governments undertake to adopt the legislative, technical and administrative measures specified this Convention and in supplementary agreements pursuant to Article III.

2. Each contracting Government shall assume responsibility for the fulfilment within its territories of all requirements under this Convention.

ARTICLE II

Scope

1. For the purposes of this Convention the term " plants " shall comprise living plants and parts thereof, including seeds in so far as the supervision of their importation under Article VI of the Convention or the issue of phytosanitary certificates in respect of them under Articles IV (1), (*a*), (*iv*) and V of this Convention may be deemed necessary by contracting Governments ; and the term " plant products " shall comprise unmanufactured and milled material of plant origin, including seeds in so far as they are not included in the term " plants ".

2. The provisions of this Convention may be deemed by contracting Governments to extend to storage places, containers, conveyances, packing material and accompanying media of all sorts including soil involved in the international transportation of plants and plant products.

3. This Convention shall have particular reference to pests and diseases of importance to international trade.

ARTICLE III

Supplementary Agreements

1. Supplementary agreements applicable to specific regions, to specific pests or diseases, to specific plants and plant products, to specific methods of international transportation of plants and plant products, or otherwise supplementing the provisions of this Convention, may be proposed by the Food and Agriculture Organization of the United Nations (hereinafter referred to as

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* Extract from " International Plant Protection Convention ", Food and Agricultural Organisation of the United Nations, Rome, 1951.

" FAO ") on the recommendation of a contracting Government or on its own initiative, to meet special problems of plant protection which need particular attention or action.

2. Any such supplementary agreements shall come into force for each contracting Government after acceptance in accordance with the provisions of the FAO Constitution and Rules of Procedure.

ARTICLE IV

National Organization for Plant Protection

1. Each contracting Government shall make provision, as soon as possible and to the best of its ability, for

(*a*) an official plant protection organization, with the following main functions:

(*i*) the inspection of growing plants, of areas under cultivation (including fields, plantations, nurseries, gardens and green-houses), and of plants and plant products in storage and in transportation particularly with the object of reporting the existence, outbreak and spread of plant diseases and pests and of controlling those pests and diseases;

(*ii*) the inspection of consignments of plants and plant products moving in international traffic, and, as far as practicable, the inspection of consignments of other articles or commodities moving in international traffic under conditions where they may act incidentally as carriers of pests and diseases of plants and plant products, and the inspection and supervision of storage and transportation facilities of all kinds involved in international traffic whether of plants and plant products or of other commodities, particularly with the object of preventing the dissemination across national boundaries of pests and diseases of plants and plant products;

(*iii*) the disinfestation or disinfection of consignments of plants and plant products moving in international traffic, and their containers, storage places, or transportation facilities of all kinds employed;

(*iv*) the issue of certificates relating to phytosanitary condition and origin of consignments of plants and plant products (hereinafter referred to as " phytosanitary certificates ");

(*b*) the distribution of information within the country regarding the pests and diseases of plants and plant products and the means of their prevention and control;

(*c*) research and investigation in the field of plant protection.

2. Each contracting Government shall submit a description of the scope of its national organization for plant protection and of changes in such organization to the Director General of FAO, who shall circulate such information to all contracting Governments.

ARTICLE V

Phytosanitary Certificates

1. Each contracting Government shall make arrangements for the issue of phytosanitary certificates to accord with the plant protection regulations of other contracting Governments, and in conformity with the following provisions :

(*a*) Inspection shall be carried out and certificates issued only by or under the authority of technically qualified and duly authorized officers and in such circumstances and with such knowledge and information available to those officers that the authorities of importing countries may accept such certificates with confidence as dependable documents.

(*b*) Each certificate covering material intended for planting or propagation shall be as worded in the Annex to this Convention and shall include such additional declaration as may be required by the importing country. The model certificate may also be used for other plants or plant products where appropriate and not inconsistent with the requirements of the importing country.

(*c*) The certificates shall bear no alterations or erasures.

2. Each contracting Government undertakes not to require consignments of plants intended for planting or propagation imported into its territories to be accompanied by phytosanitary certificates inconsistent with the model set out in the Annex to this Convention.

ARTICLE VI

Requirements in Relation to Imports

1. With the aim of preventing the introduction of diseases and pests of plants into their territories, contracting Governments shall have full authority to regulate the entry of plants and plant products, and to this end, may :

(*a*) prescribe restrictions or requirements concerning the importation of plants or plant products ;

(*b*) prohibit the importation of particular plants or plant products, or of particular consignment of plants or plant products ;

(*c*) inspect or detain particular consignments of plants or plant products ;

(*d*) treat, destroy or refuse entry to particular consignments of plants or plant products, or require such consignments to be treated or destroyed.

2. In order to minimize interference with international trade, each contracting Government undertakes to carry out the provisions referred to in paragraph 1 of this Article in conformity with the following :

(*a*) Contracting Governments shall not, under their plant protection legislation, take any of the measures specified in paragraph 1 of this Article unless such measures are made necessary by phytosanitary considerations.

(*b*) If a contracting Government prescribes any restrictions or requirements concerning the importation of plants and plant products into its territories it shall publish the restrictions or requirements and communicate them immediately to the plant protection services of other contracting Governments and to FAO.

(*c*) If a contracting Government prohibits, under the provisions of its plant protection legislation, the importation of any plants or plant products, it shall publish its decision with reasons and shall immediately inform the plant protection services of other contracting Governments and FAO.

(*d*) If a contracting Government requires consignments of particular plants or plant products to be imported only through specified points of entry, such points shall be so selected as not unnecessarily to impede international commerce. The contracting Government shall publish a list of such points of entry and communicate it to the plant protection services of other contracting Governments and to FAO. Such restrictions on points of entry shall not be made unless the plants or plant products concerned are required to be accompanied by phytosanitary certificates or to be submitted to inspection or treatment.

(*e*) Any inspection by the plant protection service of a contracting Government of consignments of plants offered for importation shall take place as promptly as possible with due regard to the perishability of the plants concerned. If any consignment is found not to conform to the requirements of the plant protection legislation of the importing country, the plant protection service of the exporting country shall be informed. If the consignment is destroyed, in whole or in part, an official report shall be forwarded immediately to the plant protection service of the exporting country.

(*f*) Contracting Governments shall make provisions which, without endangering their own plant production, will reduce to a minimum the number of cases in which a phytosanitary certificate is required on the entry of plants or plant products not intended for planting, such as cereals, fruits, vegetables and cut flowers.

(*g*) Contracting Governments may make provision for the importation for purposes of scientific research of plants and plant products and of specimens of plant pests and disease causing organisms under conditions affording ample precaution against the risk of spreading plant diseases and pests.

3. The measures specified in this Article shall not be applied to goods in transit throughout the territories of contracting Governments unless such measures are necessary for the protection of their own plants.

ARTICLE VII

International Co-operation

The contracting Governments shall co-operate with one another to the fullest practicable extent in achieving the aims of this Convention, in particular as follows :

(*a*) Each contracting Government agrees to co-operate with FAO in the establishment of a world reporting service on plant diseases and pests making full use of the facilities and services of existing organisations for this purpose, and

when this is established, to furnish to FAO periodically the following information :

(*i*) reports on the occurrence, outbreak and spread of economically important pests and diseases of plants and plant products which may be of immediate or potential danger ;

(*ii*) information on means found to be effective in controlling the pests and diseases of plants and plant products.

(*b*) Each contracting Government, shall, as far as is practicable, participate in any special campaigns for combating particular destructive pests or diseases which may seriously threaten crop production and need international action to meet the emergencies.

ARTICLE VIII

Regional Plant Protection Organization

1. The contracting Governments undertake to co-operate with one another in establishing regional plant protection organization in appropriate areas.

2. The regional plant protection organizations shall function as the co-ordinating bodies in the areas covered and shall participate in various activities to achieve the objectives of this Convention.

ARTICLE IX

Settlement of Disputes

1. If there is any dispute regarding the interpretation or application of this Convention. or if a contracting Government considers that any action by another contracting Government is in conflict with the obligations of the latter under Articles V and VI of this Convention, especially regarding the basis of prohibiting or restricting the imports of plants or plant products coming from its territories, the Government or Governments concerned may request the Director General of FAO to appoint a committee to consider the question in dispute.

2. The Director General of FAO shall thereupon, after consultation with the Governments concerned, appoint a committee of experts which shall include representatives of those Governments. This committee shall consider the question in dispute, taking into account all documents and other forms of evidence submitted by the Governments concerned. This committee shall submit a report to the Director General of FAO who shall transmit it to the Governments concerned, and to other contracting Governments.

3. The contracting Governments agree that the recommendations of such a committee, while not binding in character, will become the basis for renewed consideration by the Governments concerned of the matter out of which the disagreement arose.

4. The Governments concerned shall share equally the expenses of the experts.

ARTICLE X

Substitution of prior Agreements

This Convention shall terminate and replace, between contracting Governments, the International Convention respecting measures to be taken against the *Phylloxera vastatrix* of 3 November 1881, the additional Convention signed at Berne on 15 April 1889 and the International Convention for the Protection of Plants signed at Rome on 16 April 1929.

ARTICLE XI

Territorial Application

1. Any Government may at the time of ratification or adherence or at any time thereafter communicate to the Director General of FAO a declaration that this Convention shall extend to all or any of the territories for the international relations of which it is responsible, and this Convention shall be applicable to all territories specified in the declaration as from the thirtieth day after the receipt of the declaration by the Director General.

2. Any Government which has communicated to the Director General of FAO a declaration in accordance with paragraph 1 of this Article may at any time communicate a further declaration modifying the scope of any former declaration or terminating the application of the provisions of the present Convention in respect of any territory. Such modification or termination shall take effect as from the thirtieth day after the receipt of the declaration by the Director General.

3. The Director General of FAO shall inform all signatory and adhering Governments of any declaration received under this Article.

ARTICLE XII

Ratification and Adherence

1. This Convention shall be open for signature by all Governments until 1 May 1952 and shall be ratified at the earliest possible date. The instruments of ratification shall be deposited with the Director General of FAO, who shall give notice of the date of deposit to each of the signatory Governments.

2. As soon as this Convention has come into force in accordance with Article XIV, it shall be open for adherence by non-signatory Governments. Adherence shall be effected by the deposit of an instrument of adherence with the Director General of FAO, who shall notify all signatory and adhering Governments.

ARTICLE XIII

Amendment

1. Any proposal by a contracting Government for the amendment of this Convention shall be communicated to the Director General of FAO.

2. Any proposed amendment of this Convention received by the Director General of FAO from a contracting Government shall be presented to a regular or special session of the Conference of FAO for approval and, if the amendment involves important technical changes or imposes additional obligations on

the contracting Governments, it shall be considered by an advisory committee of specialists convened by FAO prior to the Conference.

3. Notice of any proposed amendment of this Convention shall be transmitted to the contracting Governments by the Director General of FAO not later than the time when the agenda of the session of the Conference at which the matter is to be considered is dispatched.

4. Any such proposed amendment of this Convention shall require the approval of the Conference of FAO and shall come into force as from the thirtieth day after acceptance by two-thirds of the contracting Governments. Amendments involving new obligations for contracting Governments, however, shall come into force in respect of each contracting Government only on acceptance by it and as from the thirtieth day after such acceptance.

5. The instruments of acceptance of amendments involving new obligations shall be deposited with the Director General of FAO, who shall inform all contracting Governments of the receipt of acceptances and the entry into force of amendments.

ARTICLE XIV

Entry into Force

As soon as this Convention has been ratified by three signatory Governments it shall come into force between them. It shall come into force for each Government ratifying or adhering thereafter from the date of deposit of its instrument of ratification or adherence.

ARTICLE XV

Denunciation

1. Any contracting Government may at any time give notice of denunciation of this Convention by notification addressed to the Director General of FAO. The Director General shall at once inform all signatory and adhering Governments.

2. Denunciation shall take effect one year from the date of receipt of the notification by the Director General of FAO.

ANNEX

MODEL PHYTOSANITARY CERTIFICATE

PLANT PROTECTION SERVICE

Of ..... No. .....

This is to certify

that the plants, parts of plants or plant products described below or representative samples of them were thoroughly examined on (date) .....
by (name) .....an authorized officer of the (service)
.....and were found to the best of his knowledge to be substantially free from injurious diseases and pests ; and that the consignment is believed to conform with the current phytosanitary regulations of the importing country both as stated in the additional declaration hereon and otherwise.

Fumigation or disinfection treatment (if required by importing country)

Date ..... Treatment .....

Duration of exposure ..... Chemical & concentration .....

Additional declaration

..... 19 .....

.....

(Signature)

.....

(Rank)

(Stamp of the Service)

DESCRIPTION OF THE CONSIGNMENT

Name and address of exporter .....

Name and address of consignee .....

Number and description of packages .....

Distinguishing marks .....

Origin (if required by importing country) .....

Means of conveyance.....

Point of entry .....

Quantity & name of produce .....

Botanical name (if required by importing country) .....

NICOTINE SULPHATE*

It is a curious fact that while the tobacco plant is susceptible to the attacks of several insect pests, the alkaloid nicotine can be used as an insecticide. For a long time tobacco decoction, prepared by boiling or soaking over-night tobacco leaves, stems, etc., in water and adding soap to the mixture, has been in use in India for controlling insect pests of the sucking type, chiefly aphids. Nicotine sulphate has served the same purpose as a standardised and ready-to-use product.

2. In commercial practice, the alkaloid nicotine is extracted by passing steam under pressure through tobacco stems which are made alkaline by lime water. The steam containing the nicotine is then condensed and from this condensate either a volatile nicotine preparation or the more common nicotine sulphate is made for insecticidal use. Nicotine sulphate is made by neutralising the condensate with sulphuric acid and evaporating most of the water.

3. Nicotine sulphate is at present not manufactured in India. However, the National Chemical Laboratory at Poona, recently developed a method for the production of nicotine sulphate. This involved the construction of an apparatus called the Nicotine Extraction Tower, which has been patented under the Indian Patent No. 46994 of the Council of Scientific & Industrial Research. The production method itself has been patented under the Indian Patent No. 45666 of the C.S.I.R. From information informally obtained from the Secretary, National Research Development Corporation of the Ministry of Natural Resources and Scientific Research, it appears that arrangements for selling the patent rights to a firm in Bombay for the manufacture of nicotine sulphate in India have reached final stages and are expected to be settled soon.

4. According to Patel and Srivastava (" Wealth from Tobacco Waste " *Indian Farming*, Vol. III, No. 8, pp. 15 and 32), 38 million lbs. of tobacco waste are almost lost annually in India. Besides, about 25 million lbs. of tobacco stems, which have limited uses in blending with *hukka* tobacco, or in adulterating *bidi* tobacco, are also not put to good use. The cost of these types of tobacco is roughly estimated at Rs. two crores, which has been considered to be, more or less, a national loss. With the manufacture of nicotine sulphate from the tobacco waste, an indigenous product would be well utilized, an insecticide would become available in the country and some foreign exchange expended on the import of nicotine sulphate or some other insecticides also should be saved or reduced.

5. So far, the annual demands for nicotine sulphate in India have hardly exceeded one ton. The reasons have been (*i*) the greater popularity of tobacco decoction, as prepared locally from crude tobacco ; (*ii*) the rather high cost of nicotine sulphate (Rs. 8—10 per lb.) and (*iii*) the appearance of such modern synthetic chemical insecticides as DDT and BHC. However, the use of tobacco decoction presents two serious difficulties. First, the tobacco leaves, stems,

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* This paper has been prepared in the Directorate of Plant Protection, Quarantine and Storage, New Delhi.

dust, etc., used for preparing the decoction, naturally contain varying amounts of the alkaloid nicotine and, therefore, no very standardised formula can be prescribed for its preparation and use, which leads to some times erratic results in pest control work. Secondly, tobacco being a commodity subject to excise duty, it can be available to cultivators only at prices which are fixed for chewing and smoking tobacco and not for tobacco intended for insecticidal purposes. Government departments are of course able to obtain duty-free tobacco but ultimately it is the cultivator who is to buy tobacco for use in controlling pests on his crops. The price of duty-free tobacco fluctuates round about Rs. 20 per maund against Rs. 40—45 per maund for duty-paid tobacco. The production of nicotine sulphate should do away with these two difficulties.

6. Tobacco decoction or nicotine sulphate can be effectively used to control the following pests :—

(*i*) Aphids infesting mustard, beans, brinjal, wheat, barley and other crops and also ornamental plants such as roses and winter annuals

(*ii*) Woolly aphis of apple trees and peach leaf curling aphis on peach trees.

(*iii*) Citrus psylla on citrus trees.

(*iv*) Possibly, jassids on cotton, brinjal and potato crops, thrips on onion crop and mango hoppers on mango trees.

Against all these pests, DDT, BHC and other chemical insecticides have been in use. Nicotine sulphate should be particularly suitable for controlling sucking insects, chiefly aphids, on various vegetable crops on which chemical insecticides are best avoided. At present DDT is about the only insecticide, which is being used for controlling mango hoppers on mango trees in India.

7. On a rough calculation, one lb. of nicotine sulphate (40 per cent, as is commonly available at present) should provide 80 gallons of spray liquid sufficient, to spray crop areas of 2-3 acres or 20—40 fruit trees. Therefore according to the current price rates, Rs. 4-5 worth of nicotine sulphate should be required to spray 1-1½ acres of crop area against about Rs. 6 of DDT and Rs. 3-4-0 of BHC. It may also be assumed that one ton of nicotine sulphate (40 per cent) would be required for spraying a crop area of about 4500—7000 acres.

8. There are various firms manufacturing nicotine sulphate in the U.K. and the U.S.A., though the import of nicotine sulphate in India has lately been only from soft currency areas. This import however has not been much. This Directorate recommended the import of one ton of nicotine sulphate by M/s Standard Chemical and Pharmaceutical Co., of Bombay during 1952-53 and of six tons by M/s Bharat Pulverising Mills of Bombay, during January—June 1953.

9. Tobacco seed oil has also been known to possess insecticidal properties and has been used in India against some pests.

PRECAUTIONS TO BE TAKEN WHEN USING ORGANIC PHOSPHORUS INSECTICIDES*

Organic phosphorus compounds are formulated as wettable powders (" Thiophos ", etc.), as water miscible preparations (" Isopestox ", H.E.T.P. T.E.P.P., etc.), and as emulsifiable concentrates (parathion or E605, " Fosferno " " Folidol ", " Murphos ", E.P.N., " Metacide ", " Malathon ", " Pestox 3 " " Hanane ", etc.).

Symptoms of Poisoning :

Symptoms of poisoning may occur during the period when an operator is exposed to toxic concentrates and diluted spray formulations or some hours afterward. Loss of appetite, nausea, headache, dizziness, restlessness, and twitching of muscles are early symptoms of poisoning. Tremulousness, apprehension, excessive sweating, and salivation may be followed by vomiting abdominal cramp, etc. Of grave importance are evidence of respiratory distress, effusion of fluid into the lungs, and convulsions, which may be followed by loss of consciousness. Constriction of the pupils to pinpoint size with disturbance of vision sometimes occurs.

Mild effects of poisoning, which show as headache, loss of appetite, nausea, or increased fatigue, are often ignored or attributed to other causes. If due to poisoning, they could be accompanied by a significant reduction of cholinesterase (an enzyme connected with normal functioning of the nervous system).

Absorption of organic phosphorus insecticides occurs readily through the skin, by inhalation, and by ingestion. Dangerous amounts of these poisons may be absorbed as a result of accidents, or by carelessness, or by poisoning due to repeated intake of small amounts which may result from failure to appreciate and observe carefully the recommended precautions. Generally growers regard the use of respirators and protective equipment as " sissy ".

A person who has experienced poisoning by organic phosphorus compounds may be more susceptible to further exposure within a period of 2 to 8 weeks. On no account should such a person be further exposed until the period of recovery has elapsed.

Poisoning may occur when the spray mixture is being prepared or applied. Mild symptoms of poisoning such as headache and nausea may be claimed by people who fear poisoning through working with organic phosphorus compounds, and tests for blood cholinesterase estimation will be necessary to investigate such claims. If these compounds are handled properly, the health hazard to users is very slight.

Precautions :

Inhalation and skin absorption as means of poisoning are the major aspects to be considered and the following precautions are recommended to avoid accidents.

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* Extract from New Zealand Journal of Agriculture, Vol. 87, No. 4, pp. 371—375 1953.

FORMULATING AND PACKAGING :

Protective clothing such as aprons, gloves, and boots should be worn and should be cleaned daily. Respirators must be worn.

Vapour or dust hazards should be reduced to a minimum by ventilation and by installation of exhaust fans.

Contact of liquid with the skin must be avoided. If such contact occurs, contaminated parts must be washed with soap and water and if possible a mild alkali should be added to the water to encourage hydrolysis of the compound. Atropine may be administered to affected persons, and medical aid should be sought. Affected persons must not return to work until permitted to do so by a doctor.

Contaminated clothing must be removed immediately after spraying and should be washed before it is used again.

Adequate facilities for washing must be provided. Strict attention must be paid to washing before meals and at the end of working periods.

Smoking, eating, and drinking must be prohibited when these insecticides are being handled.

Spillage on floors should be covered with sawdust or earth and later removed and buried. The floor should then be scrubbed with a solution of washing soda. (1 lb. in 3 gallons of water). If concentrate is spilt on the soil, the contaminated area should be dug up and the soil should be removed and buried.

Implements used for spraying should be washed with a solution of washing soda and water and rinsed with clean water.

Labelling.—Containers holding phosphorus insecticides must be labelled clearly. The word 'Poison' should appear on the label and recommendations for the safe handling of the compounds, first aid treatment, and methods of disposal of containers should be given.

Recommendations to Growers.—Store containers in a safe, cool place under lock and key and away from food.

Keep containers tightly closed.

Use overalls or an old suit, natural rubber boots, natural rubber gloves, apron, and face mask or respirator when handling concentrate.

Open containers with care to avoid splashing. If concentrate is spilt on the skin or is splashed into the eyes, wash it off immediately with warm water. Inform a doctor immediately. Remove clothing immediately if it becomes contaminated and wash it well. Wash affected clothing before wearing it again.

Wash hands thoroughly after using phosphorus insecticides, particularly before eating or smoking.

Measure and mix the spray out of doors.

Remove soil on which spillage has occurred and bury it.

Do not eat, drink, smoke when handling phosphorus insecticides or where they are being handled.

Destroy all containers by burning or burying to avoid accidents to children and animals.

Avoid exposure when filling a spray tank by wearing protective clothing.

Wear natural rubber gloves with gauntlets, natural rubber boots, overalls, and sou'wester when spraying fruit trees, hops, and tall crops. When spraying low-growing crops use natural rubber boots and natural rubber gloves. When spraying in glass-houses use natural rubber gloves and natural rubber boots and respirator. Occasional contact with spray drift when operating with the dilutions recommended for normal high-volume spray need not cause anxiety. Continued exposure to spray drift is, however, dangerous. Tractor drivers should wear complete protective clothing and respirators or visor-type helmets. Where practicable tractors should be fitted with air-conditioned, gas-proof cabs or have a removable canopy to reduce spray drift hazards.

Avoid spraying in windy weather.

Do not clear blocked jets by blowing them out with the mouth.

Wash out thoroughly all equipment with water containing a wetting agent and soda.

Do not let spray drift on to people or animals in the neighbourhood. Warn people on adjacent land before spraying an area.

Do not apply materials other than H.E.T.P. and T.E.P.P. within 4 weeks of harvest, to avoid toxic residues.

Discard left-over spray mixtures by emptying tanks into holes dug in the ground and take care not to contaminate streams.

Do not handle fruit or foliage for 4 days after spraying with materials other than H.E.T.P. or T.E.P.P. Harvesting should not be undertaken for 14 days after spraying. Post signs warning people against entering the contaminated area during the danger periods already specified.

Conclusions.—Organic phosphorus insecticides have been used in large quantities in home gardens and in commercial practice. They are highly toxic compounds and their use calls for the greatest care to avoid accidents. There is, however, no reasons to regard them as too dangerous to use. Accidents which have occurred were the result of ignorance and lack of precautions. If proper protective measures are taken, there is little danger from their use.

RULES FOR REGULATING THE IMPORT OF PLANTS, ETC. INTO INDIA

Notification No. F. 320-35-A., dated the 20th July 1936

In exercise of the powers conferred by sub-section (1) of section 3 of the Destructive Insects and Pests Act, 1914 (II of 1914), and in supersession of the notification of the Government of India in the late Department of Revenue and Agriculture, No. 580-240, dated the 22nd June 1922, the Governor General-in-Council is pleased to issue the following order for the purpose of prohibiting, regulating and restricting the import into India of the articles hereinafter specified,

1. In this order—

(*i*) " Official certificate " means a certificate granted by the proper officer or authority in the country of origin; and the officers and authorities named in the 3rd column of the first Schedule appended hereto are the proper officers and authorities to grant, in the countries named in the second column, the certificates required by the provisions referred to in the first column thereof;

(*ii*) " Plant " means a living plant or part thereof but does not include seeds ; and

(*iii*) " Prescribed port " means any of the following ports, namely, Bombay, Calcutta, Cochin, Dhanushkodi, Madras, Negapatam, Port Blair, Vizagapatam and Tuticorin ;

(*iv*) All provisions referring to plants or seeds shall apply also to all packing material used in packing or wrapping such plants or seeds.

2. No plant shall be imported into India by means of the letter or sample post; provided that sugarcane for planting intended to be grown under the personal supervision of the Government Sugarcane Expert, Coimbatore, may be imported by him by such post.

3. No plant shall be imported into India by air ; provided that plants which are infested with living insects and are intended for the introduction of such living insects may be so imported if they are accompanied by a special certificate from the Head of Division of Entomology, Indian Agricultural Research Institute or the Forest Entomologist, Forest Research Institute, Dehra Dun that such plants are imported for the purpose of introducing such insects.

Provided further that plants required for the purpose of research and propagation by any institution or organisation under the control of the Central Government or the State Governments may be so imported only at the airport of Bombay or Madras, if such plants are :—

(*i*) fumigated before export ;

(*ii*) packed in a container which shall not enable insects either to enter therein or to escape therefrom ;

(*iii*) accompanied by an official phytosanitary certificate in the form prescribed in the Third Schedule appended hereto ;

(*iv*) inspected and fumigated, if necessary, on arrival at the airport of Bombay or Madras, as the case may be ;

Subject to the condition that such institution or organisation shall furnish to the Collector of Customs concerned at least fifteen days in advance of the expected date of arrival, particulars of the consignment :

Provided also that the import by air from Afghanistan of fruits and vegetables intended for consumption may be permitted after fumigation at the airport at Amritsar, on condition that the importer pays a fee of Rs. 1/8- (Rupee one and annas eight only) per maund to the Plant Protection Adviser to the Government of India, to meet the cost of fumigation, and also acts in accordance with such instructions as may from time to time be issued by that officer.

4. No plants other than fruits and vegetables intended for consumption, potatoes, sugarcane and unmanufactured tobacco either raw or cured, shall be imported into India by sea except after fumigation with hydrocyanic acid gas, methyl bromide or ethylene dibromide and at a prescribed port.

Provided that plants, which are infected with living fungi and cultures of living fungi and are imported for the introduction of such fungi or for similar experiments, may be imported without fumigation if they are accompanied by a special certificate from the Forest Mycologist, Forest Research Institute, Dehra Dun, that such plants are imported for the purpose mentioned above.

Provided that plants which are infested with living parasitized insects and are intended for the introduction of such parasites may be imported without such fumigation if they are accompanied by special certificate from the Head of Division of Entomology, Indian Agricultural Research Institute or the Forest Entomologist, Forest Research Institute, Dehra Dun that such plants are imported for the purpose of introducing such parasites.

Provided further that in the case of plant breeding materials imported by the Silviculturist, Forest Research Institute, Dehra Dun, such fumigation at the prescribed Ports shall be dispensed with on the condition that he makes himself personally responsible for the effective disinfection and disinfestation under the supervision of the Forest Entomologist and Forest Mycologist of the Forest Research Institute, Dehra Dun and before release the plants are certified as free from living insects and fungi by the said officers. All such plants shall be packed in such containers as will not permit the insects reaching or leaving the plants and that such containers shall not be opened in any part of India except at Dehra Dun.

5. (1) No plants, other than unmanufactured tobacco imported from Burma, fruits and vegetables intended for consumption and potatoes, shall be imported into India by sea unless accompanied by an official certificate that they are free from injurious insects and diseases.

(2) The certificate shall be in the form prescribed in the Third Schedule or in a form as near thereto as may be and supplying all the information called for in that form.

6. Potatoes, other than potatoes from Burma, shall not be imported into India by sea, except through the port of Bombay or Madras, unless such potatoes are inspected, and if necessary, fumigated and disinfected by the Plant Protection Adviser to the Government of India or any person duly empowered by him in this behalf at the port of Bombay or Madras and certified by him to be free from pests and diseases and are also accompanied by—

(a) a certificate from the consignor stating fully in what country and in what district of such country the potatoes were grown and

(b) an official certificate stating—

(*i*) that no case of wart disease (*Synchytrium endobioticum*) of potatoes or the existence of the pests, Golden nematode (*Heterodera rostochiensis*) and Colorado potato beetle (*Leptinotarsa decemlineata*) in any stage of development has occurred at any time during twelve months preceding the date of the certificate within five miles of the place where the potatoes included in the consignment were grown;

(*ii*) that the crop from which the potatoes were derived was officially inspected in the field and that the degree of freedom from virus diseases was sufficiently high to ensure the suitability of the progeny for seed purposes and that the said crop was not grown in the vicinity of any unhealthy potato crop ;

(*iii*) that a representative sample of potatoes included in the consignment was thoroughly examined and found to be healthy and there was no evidence in it of the presence of any insect pest or fungus destructive to agricultural and horticultural crops;

(*iv*) that the potatoes included in the consignment are free from Colorado beetle, Golden nematode and wart disease.

Provided also that potatoes may be imported under a certificate from the Head of Division of Botany, Indian Agriculture Research Institute, or the Plant Protection Adviser to the Government of India, or the Director, Central Potato Research Institute.

7. Rubber plants shall not be imported into India by sea unless, in addition to the general certificate required under Rule 5, they are accompanied by an official certificate that the estate from which the plants have originated or the individual plants are free from *Fomes lignosus*, *Sphaerostilbe repens*, *Dothidella ulei* (=*Melanopsammopsis ulei*, *Fusicladium macrosporum*) *and Oidium heveae*.

8 A. No Lemon plants, Lime plants, Orange plants, Grape Fruit plants or other citrus plants and no cuttings of such plants shall be imported into India unless, in addition to the general certificate required under Rule 5 they are accompanied by an official certificate that they are free from the *Mal Secco* caused by *Deuterophoma tracheiphila* or that the disease does not exist in the country in which they were grown.

8 B. (1) Subject to the provisions of sub-paragraph (2) unmanufactured tobacco either raw or cured, shall not be imported into India by sea except from Burma, or the Kalat State, unless, in addition to the general certificate required under Rule 5, it is accompanied by an official certificate that it is free from *Ephestia clutella* or that the pest does not exist in the country of origin.

Provided that in the case of tobacco unaccompanied by such certificates, the consignment shall be examined on importation by such officer as the Central Government may appoint on payment of such fee, if any, to meet the cost of such examination, as it may direct.

(2) Notwithstanding anything contained in sub-paragraph (1), unmanufactured tobacco may be imported into India by sea without the certificates referred to therein if the following conditions are fulfilled, namely :—

(*i*) the consignee of the tobacco has, within the period specified in sub-paragraph (3) furnished to the Collector of Customs, Bombay, and to the Entomologist Incharge, Fumigatorium, Sewri, Bombay, the following information, namely :—

(a) the name of the ship carrying the consignment ;

(b) the probable date of arrival of the ship in Bombay ; and

(c) the number of cases contained in the consignment,

(*ii*) On arrival of the tobacco in Bombay, the tobacco is disinfected by HCN or such other fumigant, at the Fumigatorium of the Directorate of Plant Protection, Quarantine and Storage, and in such manner as may be prescribed by rules made in this behalf under section 5 of the said Act,

(*iii*) (a) If samples of tobacco are imported by parcel post or as ship's parcel each parcel not exceeding 20 lbs. in weight, a fee of rupees three per case ;

(*b*) in any other case, a fee of Rs. 5-2-6 per case of 440 lbs., of tobacco is paid to the Collector of Customs, Bombay in accordance with such instructions as may be issued by the said Collector to meet the cost of fumigation. The fee of Rs. 5-2-6 does not include charges for unloading from the ship, transportation from the docks to the fumigatorium and import duty as specified in the Bombay Port Trust scale of Charges.

(3) The information referred to in clause (*i*) of sub-paragraph (2) shall be furnished—

(a) if the duration of the voyage between the port of despatch and the port of Bombay is less than three weeks, at least seven days before the probable date of the arrival of the ship at Bombay ; and

(b) if the duration of such voyage is longer than three weeks, at least fourteen days before the probable date of the arrival of the ship at Bombay.

8. C Unmanufactured tobacco either raw or cured, shall not be imported into India by air except from Burma and the Kalat State:

Provided that the transit of such tobacco through India by air or its transhipment shall be allowed—

(a) if such tobacco is accompanied by an official phytosanitary certificate referred to in rule 5 and rule 8 B and

(b) it is packed in a container in such a way as not to allow any insect to reach or leave it and the container is not opened in any part of India.

9. (1) The importation of sugarcane into India by sea from the Fiji Islands New Guinea, Australia or the Philippine Islands is prohibited absolutely.

(2) The importation of sugarcane into India by sea from any other country is prohibited unless, in addition to the general certificate required under Rule 5, it is accompanied by an official certificate that it has been examined and found free from cane borers, scale insects, white flies, root disease (any form), pine-apple disease *Ceratostomella paradoxa* (*Thielaviopsis paradoxa*), sereh and cane gummosis, that it was obtained from a crop which was free from mosaic disease and that the Fiji disease of sugarcane does not occur in the country of export:

Provided that in the case of canes for planting imported direct by the Government Sugarcane Expert, Coimbatore, and intended to be grown under his personal supervision, such certificates shall be required only in respect of the freedom of the country of export from the Fiji disease of sugarcane.

10. (*i*) Hevea rubber plants and hevea rubber seeds shall not be imported into India from America or from the West Indies except by the Director of Agriculture, Madras.

(*ii*) Rubber seeds from other countries may be imported into India only after fumigation and disinfection at the port of entry namely Madras or Bombay as the case may be.

11. (a) Seeds of flax, berseem and cotton shall not be imported by letter or sample post, or otherwise than by sea.

(b) The importation of ' Mexican Jumping Beans ' (*Sebastiania palmeri* of the family Euphorbiaceae) is prohibited absolutely.

12. Coffee plants, coffee seeds and coffee beans shall not be imported into India except for experimental planting purposes only by the Director of Research, Indian Coffee Board, Bangalore who shall take all measures necessary

to ensure that such coffee plants, beans or seeds as are imported by him are free from plant diseases and injurious insects. Provided that the prohibition hereinbefore contained shall not apply (1) to roasted and ground coffee, or (*ii*) to a consignment of unroasted or unground coffee beans or seeds produced in India or in Burma and covered by a certificate of origin in the form set forth in the fourth schedule appended hereto and signed by one of the authorities specified in the fifth schedule appended hereto.

13. Flax seeds and berseem (Egyptian clover) seeds shall not be imported into India by sea, unless the consignee produces before the Collector of Customs a licence from a Department of Agriculture in India in that behalf.

14. (1) Unginned cotton other than cotton from a port of Saurashtra or of the Lasbella or Kalat State which has been produced in India shall not be imported by sea or by air.

(2) Cotton seed shall not be imported by sea, save for experimental purposes by one of the officers named in the second schedule appended hereto, and shall not be so imported by such officer save at the port of Bombay and in quantities not exceeding one hundred weight in any one consignment and on condition that it will be fumigated on importation with Carbon bisulphide or Methyl bromide :

Provided that, if the cotton seed is accompanied by a certificate from a Government Entomologist of the country of origin to the effect that the seed and its container have been treated in such a way as to destroy all insect life, the seed shall be examined on importation by such officer as the Central Government may appoint and shall not be required to be refumigated unless such examination shows that refumigation is necessary.

14A. Sunflower seed shall not be imported into India from Argentina and Peru by means of letter or sample post or as passenger's accompanied baggage or by any other means.

14B. No bulbs or plants of onion (*Allium cepa*), garlic (*Allium sativum*) shallot (*Allium ascalonicum*), leek (*Allium porrum*), chive (*Allium schoednoprasum*) shall be imported into India unless they are accompanied, in addition to the general certificate required under paragraph 5, by an official phytonsanitary certificate guaranteeing freedom from the fungus disease *Urocystis cepulae*.

15. Nothing in these rules shall be deemed to apply to—

(1) the bringing by sea or by air from one port or place in India to another such port or place.

(2) the transit of plants through India by air or their transhipment, if they are accompanied by official certificates as prescribed in entry (*i*) of clause 1, and are packed in such containers as will not permit the insects reaching or leaving the plant material and as are not to be opened in any part of India.

FIRST SCHEDULE [Paragraph 1 (*b*)].

Rule 5—General health certificate,
Rule 6(b)—Potatoes,
Rule 7—Rubber Plants,
Rule 8A—Lemon Plants and other Citrus plants,
Rule 8B—Unmanufactured tobacco,
Rule 9—Sugarcane, etc.

Paragraph 1	Country of origin 2	Authority 3
5, 6(*b*), 7, 8A & B and 9.	Angola	The Director, Laboratory of Plant Pathology & Agricultural Entomology, Directorate of Agricultural & Commercial Services, LUANDA.
	Argentina	The Ministry of Agriculture.
	Australia	Chief Quarantine Officer for Plants.
	Belgian Congo ..	The Department of Agriculture, Industry and Commerce.
	Belgium	The Department of Agriculture (Phytopathological Service).
	Bermuda	The Department of Agriculture.
	Brazil	Service de Vigilancia Sanitaria Vegetal.
	British Guiana ..	The Department of Science & Agri.
	British Honduras ..	The Department of Agriculture.
	Burma	The Ministry of Agriculture.
	Canada	Dominion Department of Agriculture.
	Ceylon	The Ministry of Agriculture.
	China	Plant Quarantine Service, Ministry of Economic Affairs, Chungking, SZECHWAN.
	Cyprus	The Department of Agriculture.
	Denmark	The Ministry of Agriculture.
	Egypt	The Ministry of Agriculture.
	Eire	The Department of Agriculture.
	France	The Ministry of Agriculture.
	Gambia	The Department of Agriculture.
	Germany	The Department of Agriculture.
	Gold Coast ..	The Department of Agriculture.

1	2	3
5, 6(*b*), 7, 8A & B and 9—*contd*	Great Britain and Northern Ireland.	The Ministry of Agriculture and Fisheries, England. The Ministry of Agriculture, Northern Ireland. The Department of Agriculture, Scotland.
	Greece	The Ministry of Agriculture.
	Holland	The Department of Agriculture.
	Hong Kong ..	The Superintendent of Botanical and Forestry Department.
	Hungary	Kingdom of Hungary Official Phytosanitary Service (Magyar Kiralysag Hivatalos Novenyegeszsegugyi Szolgalat).
	Iraq	The Director of Agriculture, Baghdad.
	Italy	The Ministry of Agriculture.
	Jamaica	The Director, Department of Science and Agriculture, Kingston, Jamaica.
	Japan	The Ministry of Agriculture & Forestry.
	Kenya Colony ..	The Department of Agriculture.
	Malaya	The Department of Agriculture, Federation of Malaya, Kuala Lumpur.
	Malta	The Department of Agriculture.
	Mauritius	The Department of Agriculture.
	Mozambique ..	Chief Division of Entomology, Technical Service for Agriculture, Lourenco Marques.
	Republic of Indonesia	Inspector, Institute for Plant Diseases of the Department of Economic Affairs.
	New Zealand ..	The Department of Agriculture, Wellington.
	Nigeria	The Department of Agriculture.
	Norway	The Norwegian Board of Agriculture.
	Nyasaland	The Department of Agriculture.
	Palestine	The Department of Agriculture & Fisheries.
	Philippine Islands ..	The Department of Agriculture.
	Portugal (including Azores & Madeira*).	The Chief Plant Pathologist, Department of Phytopathological Services, Ministry of Agriculture, Portugal.

* The Phytopathological Services in Azores and Madeira are under the personal supervision of the Chief Plant Pathologist. Fumigation Chambers are available in Madeira at which plants may be fumigated on request of exporters. When there is doubt as to the health of plant exports the material is sent from Azores and Madeira to the Chief Plant Pathologist, for inspection and, of feasible, certification.

1	2	3
5, 6(*b*), 8A, & B and 9—*contd*	Rhodesia (Northern)	The Director of Agriculture, Mazabuka.
	Rhodesia (Southern)	The Secretary for Agriculture & Lands, Salisbury.
	Sierra Leone ..	The Department of Agriculture.
	South Africa ..	The Union of South Africa, Department of Agriculture.
	Spain	Phytopathological Inspection Service appointed by the Director General of Agriculture.
	Sweden	The Ministry of Agriculture.
	Tanganyika ..	The Department of Agriculture.
	Trinidad & Tobago ..	The Department of Agriculture.
	Uganda Protectorate	The Department of Agriculture.
	United States of America.	The Department of Agriculture.
	Windward & Leeward Islands.	Advisory Department of Agriculture at the Imperial College of Tropical Agriculture Trinidad.
	Zanzibar	The Department of Agriculture.
	*Other Countries ..	The Ministry or Department of Agriculture of the countries concerned.
	Algeria	
	Bulgaria	
	Costa Rica	
	Cuba	
	Eritrea	
	Estonia	
	Finland	
	French Equatorial Africa	
	French West Africa ..	
	Indo-China ..	
	Iran	
	Italian Somaliland ..	
	Lithuania	
	Luxemburg ..	
	Mexico	
	Morocco	
	Switzerland ..	
	Tunisia	
	Turkey	
	Union of Soviet Socialist Republics.	
	Uruguay	
	Yugoslavia ..	

* When a Customs Officer receives a certificate required by the rules from any country not specified by name in any part of the schedule which relates to such certificate, he shall before passing the consignment forward the certificate to the Government of India Ministry of Food & Agriculture (Agriculture) for information.

Additional authorities empowered to certify against the diseases specified in paragraphs 6(*b*) 7, 8A & B and 9.

Paragraph 1	Country of Origin 2	Authority 3
7	Burma	Mr. L. P. Khanna, M.Sc., Lecturer in Biology, University, College, Rangoon.
	Malay Peninsula ..	Head of the Pathologica Division of the Rubber Research Institute.
8A	Burma	Mr. L. P. Khanna, M.Sc., Lecturer in Biology University College, Rangoon.
	Italy	Royal Italian Phytopathological Institute.
	Rhodesia (Northern)..	The Department of Agriculture.
	Rhodesia (Southern)	The Department of Agriculture.
9	Australia (Queensland)	Department of Agriculture & Stock.
	Burma	Mr. L. P. Khanna, M.Sc., Lecturer in Biology, University College, Rangoon.
	Jamaica	The Department of Science & Agriculture.
	West Indies ..	The Imperial College of Tropical Agriculture, St. Augustine, Trinidad.

SECOND SCHEDULE [Paragraph 14 (2)]

The Director, Indian Agricultural Research Institute, New Delhi.

The Secretary, Indian Central Cotton Commiteee, Bombay.

The Director of Agriculture, Madras State, Madras.

The Director of Agriculture, Bombay State, Bombay.

The Director of Agriculture, Uttar Pradesh, Lucknow.

The Director of Agriculture, Madhya Pradesh, Nagpur.

The Director of Agriculture, West Bengal, Calcutta.

The Director of Agriculture, Bihar, Sabour.

The Director of Agriculture, Assam, Shillong.

The Director of Agriculture, Hyderabad State, Hyderabad.

The Director of Agriculture, Mysore State, Bangalore.

The Director, Institute of Plant Industry, Indore.

The Director of Agriculture, Madhya Bharat, Gwalior.

The Director of Agriculture, State of Saurashtra, Rajkot.

The Director of Agriculture, Travancore-Cochin, Trivandrum.

The President of the Chamber of Agriculture, Pondicherry.

THIRD SCHEDULE (Paragraph 5)

Certificate

This is to certify that the plant(s) living plant (s) or plant produces a representative sample of the plant(s), living plant(s) or plant products (strike out the words not applicable) included in the consignment, of which particulars are given below were/was thoroughly examined on the (date)..... by (name).....a duly authorised official of the..... .....and found to be healthy, no evidence of the presence of any injurious insect, pest or disease (destructive to agricultural or horticultural crops or to trees or bushes) having been found in/on them and that the consignment (including the packing) covered by this certificate has/has not been treated in the following manner (*e.g.*, fumigated with.....or disinfected with

prior

.....

immediately subsequent to inspection.

Inspected

Not inspected in the field by a duly authorised inspector on.....

(Signature) .....

(Official status) .....

Date .....

No. and description of packages.....

Distinguishing marks.....

Description of plants or plant products or parts thereof.....

Stated to be grown at.....

Exported by.....

Name and address of consignee.....

Name of vessel or particulars of route.....

Date of shipment.....

Port or place of entry.....

Additional Certificate(s) attached.....

(Give here details of any special certificate or certificates issued in respect of imports specifically scheduled).

FOURTH SCHEDULE (Paragraph 12)

Certificate of origin for Indian/Burma coffee beans or seeds

Name of consignor	Name of consignee	Gross weight	Number of packages	Mark of each package

Certified that the above consignment consists of raw coffee beans or seeds produced in India/Burma.

Signature of certifying authority

No. of Railway Receipts or
No. of Bill of Lading

Signature of Consignor

FIFTH SCHEDULE (Paragraph 12)

Certifying authority :—

(*i*) The Assistant Director of Agriculture, Chickmagalur, Kadur District, Mysore State.

(*ii*) Director of Agriculture, Travancore-Cochin.

(*iii*) The Director of Agriculture, Madras.

(*iv*) Any other officer whom the Government of Madras may appoint in this behalf by notification in the Fort St. George Gazette.

NOTES AND NEWS

(*i*) *War against Rabbits in Australia**

The annual food bill of rabbits in Australia has been estimated at considerably more than £ 300,000,000, as the pest does immense damage to pasture and water courses by starting wide spread erosion. Fortunately this most persistent and destructive enemy has suffered a crushing defeat as the hands of the Commonwealth Scientific and Industrial Research Organisation which estimates that four-fifths of the rabbits in eastern Australia have now been liquidated by using the disease, myxomatoses. This Organization believes that the great victory by the research workers must be followed by mopping-up operations that will get the rabbit under control once and for all.

(*ii*) *Antibiotics useful for Plant Diseases*†

Minute amounts of penicillin or other antibiotics can heal diseased trees or plants, according to a report made at a meeting of the Maryland Vegetable Growers Association held recently.

A colour film showing the first successful treatment of diseased plants with the drugs was put on for the grower. The film, a record of work done at the Department of Agriculture's experimental station at Beltsville, Maryland, and at other experimental stations in the State, was produced by Charles Pfizer & Co., a manufacturer of antibiotics.

Concentrations as low as a few parts of the antibiotics to a 1,000,000 parts of water, had the effect of controlling 'ring rot' in potatoes, 'halo blight' in beans, and 'bacterial rot' in spinach. Somewhat higher concentrations successfully checked the fire blight disease found in pear and apple trees.

(*iii*) *Control of Cutworms***

As a precautionary measure against damage, a poison bait should be broadcast over any ground that has been cleared of weeds and grasses, and over any areas in the soil of which cutworms may be hiding. The bait is best broadcast several days after clearing and preferably late in the after-noon.

The bait may be prepared according to the following formula :

Bran	24 lbs.
Paris green or 20% BHC	1 lb.
Water	2½ gallons.

* Extract from 'Agricultural News Letter', Release No. AGN/422 from Office of Australian Government Trade Commissioner, Bombay.

† Extract from item No. 1492 of 'Science News Letter' No. 95, dated the 20th February 1953 of Scientific Adviser, Indian High Commission, London.

** Extract from 'Agricultural Gazette of New South Wales' of August 1953, pp. 438-439.

To prepare this bait, the bran and Paris green or BHC should be mixed thoroughly, and then made into a crumbly mash with the water. The quantity given above makes 50 lbs. of prepared bait—sufficient to treat one acre.

Another poison, bait, which is used dry, may be used under some conditions and is prepared by mixing together :—

Paris green or 20% BHC or 5% DDT	1 lb.
Pollard	24 lbs.

Where crops are infested, the baits may be lightly distributed along the rows.

It should be remembered that the baits are poisonous ; they must be kept out of the reach of stock or fowls, and care should be taken in handling them.

DDT dusts and sprays will also control cutworms attacking crops and in some instances may be preferred to the baiting method, particularly for the very small caterpillars that may not readily feed upon baits. For dusting either 15 lbs. of 5 per cent dust, or 30 lbs. of 2 per cent dust, are required per acre. For spraying about 100 gallons of spray containing either 2 lbs. of 50 per cent dispersible powder or ½ gallon of 20 per cent emulsion would be required.

Where plants such as turnips, radishes, etc., are attacked, care should be taken to avoid contaminating portions of the plants that may be used for human consumption or for stock food. In order to avoid the danger of undesirable DDT residues remaining on cabbages, treatment must cease at least four weeks before cutting commences and cauliflowers must not be treated after the curd commences to form. When plants such as lettuce, spinach and others which must not be contaminated with DDT are attacked, the poison baits must be used.

Pumpkins, melons and related vine crops are susceptible to injury by DDT, and therefore, on these plants this insecticide may only be used at very low concentrations. For young tomato plants also, a 1 per cent DDT dust is preferred to a 2 per cent.

*(iv) DDT accumulations could harm Plants**

Accumulation of DDT in farm soils may retard plant growth warns Dr. Joseph M. Ginsburg, Entomologist with the New Jersey Agricultural Experiment Station, New Brunswick. In fields of sandy soil where an average of 50 lbs. of DDT per acre had been sprayed over five years time, Dr. Ginsburg found from 6 to 12 lbs. of DDT per acre in the top one foot of soil. Concentrations of 12 lbs. of DDT per acre could be near the danger point for many plants.

* Extract from ' Science News Letter ', Vol. 63, No. 19, p. 292, 1953.

(*v*) *Schradan and Bees**

British workers have produced disturbing evidence that one of the Organophosphoric systemic compounds, Schradan, can appear in nectar of blossoms. This indicates that a new and possible dangerous problem must be faced in developing the use of systemic insecticides.

(*vi*) *Maleic hydrazide controls sprouting in Potatoes & Onions*†

A formulation of maleic hydrazide MH-40 produced by the Naugtauck Chemical Division of U.S. Rubber Co. of U.S.A., controls the sprouting of stored potatoes and edible onions when sprayed on the plants before they are harvested, U.S.D.A. has just approved the material for use on these crops.

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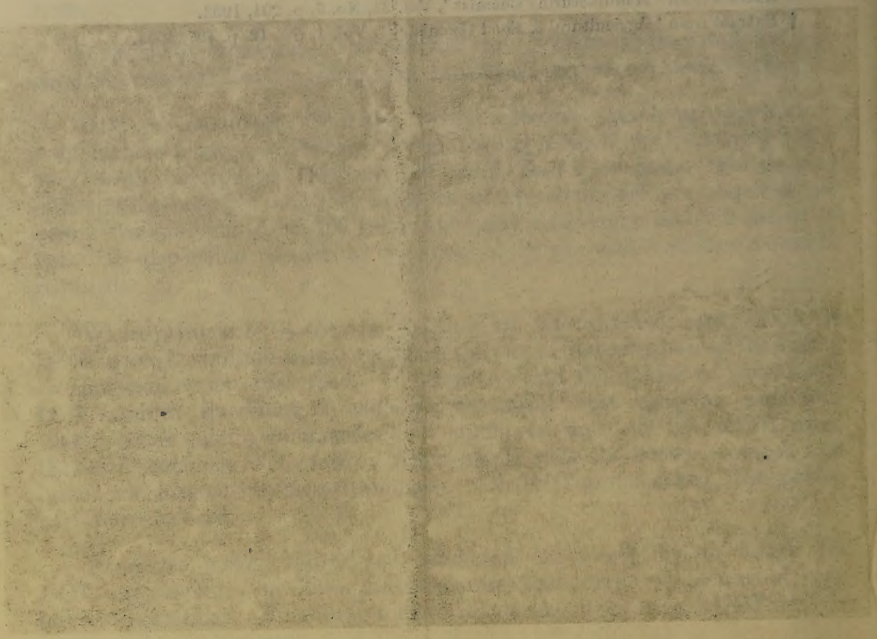
* Extract from ' Manufacturing Chemist ', Vol. 24, No. 5, p. 204, 1953.

† Extract from ' Agricultural & Food Chemistry ', Vol. 1, No. 12, p. 797, 1953.

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